

# SEQUENCE LISTING

<110> Chiaki Senoo  
Mariko Numata

<120> Novel Trypsin Family Serine Proteases

<130> 50026/027001

<140> US 09/831,180

<141> 2001-05-03

<150> PCT/JP99/06111

<151> 1999-11-02

<150> JP 1998-313366

<151> 1998-11-04

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ttt ggg gca tgt agc tca ctg gca tgg gta tgt ggc cgg cga atg agt      152
Phe Gly Ala Cys Ser Ser Leu Ala Trp Val Cys Gly Arg Arg Met Ser
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Ser Arg Ser Gln Gln Leu Asn Asn Ala Ser Ala Ile Val Glu Gly Lys
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cct gct tct gct atc gtg gga ggc aaa cct gca aac atc ttg gag ttc      248
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Pro Trp His Val Gly Ile Met Asn His Gly Ser His Leu Cys Gly Gly
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Pro	Lys	Phe	Asp	Asp	Trp	Leu	Leu	Asp	Asn	Asp	Ile	Ala	Leu	Leu	Leu	
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Gly	Lys	Asp	Ala	Cys	Gln	Gly	Asp	Ser	Gly	Gly	Ala	Leu	Val	Cys	Asn	
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Gly	Met	Gly	Cys	Gly	Lys	Lys	Asn	Leu	Pro	Gly	Val	Tyr	Thr	Lys	Val	
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Met Met Leu Pro Leu Leu Ile Ala Leu Leu Met Ala Ser Lys  
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Gly Gln Ala Lys Asp Gln Gln Glu Ser Val Leu Cys Gly His Arg Pro 30  
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gcc ttc cca aac tca tca tgg ctg cca ttg cgg gag ctg ctt gag gtc 206  
Ala Phe Pro Asn Ser Ser Trp Leu Pro Leu Arg Glu Leu Leu Glu Val 45  
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cag cat ggt gag ttc cca tgg caa gtg agt atc cag atg ctt ggg aaa 254  
Gln His Gly Glu Phe Pro Trp Gln Val Ser Ile Gln Met Leu Gly Lys 60  
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cac ctg tgt gga ggc tcc atc atc cac cgg tgg tgg gtt ctg aca gca 302  
His Leu Cys Gly Gly Ser Ile Ile His Arg Trp Trp Val Leu Thr Ala 75  
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Lys Gln Val Gln Lys Ile Ile Ala His Arg Asp Tyr Lys Pro Pro Asp 125  
115 120

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Asn Lys Asp Lys Met Pro Ile Cys Leu Pro Gln Arg Glu Asn Ser Trp 155  
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Ala Lys Gly Ser Asn Met His Leu Lys Lys Leu Arg Val Val Gln Ile 190  
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225	230	235	
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 Cys Gly Gly Ser Ile Ile His Arg Trp Trp Val Leu Thr Ala Ala His  
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 Cys Phe Pro Arg Thr Leu Leu Glu Leu Val Ala Val Asn Val Thr Val  
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 100 105 110  
 Val Gln Lys Ile Ile Ala His Arg Asp Tyr Lys Pro Pro Asp Leu Asp  
 115 120 125  
 Ser Asp Leu Cys Leu Leu Leu Leu Ala Thr Pro Ile Gln Phe Asn Lys  
 130 135 140

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Gly	Ser	Asn	Met	His	Leu	Lys	Lys	Leu	Arg	Val	Val	Gln	Ile	Ser	Trp
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Ala His Cys Phe Arg Arg Thr Leu Leu Asp Met Ala Val Val Asn Val	
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 Glu Cys Pro Trp Gln Val Ser Ile Gln Met Ser Arg Lys His Leu Cys  
 50 55 60  
 Gly Gly Ser Ile Leu His Trp Trp Trp Val Leu Thr Ala Ala His Cys  
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 Phe Arg Arg Thr Leu Leu Asp Met Ala Val Val Asn Val Thr Val Val  
 85 90 95  
 Met Gly Thr Arg Thr Phe Ser Asn Ile His Ser Glu Arg Lys Gln Val  
 100 105 110  
 Gln Lys Val Ile Ile His Lys Asp Tyr Lys Pro Pro Gln Leu Asp Ser  
 115 120 125  
 Asp Leu Ser Leu Leu Leu Leu Ala Thr Pro Val Gln Phe Ser Asn Phe  
 130 135 140  
 Lys Met Pro Val Cys Leu Gln Glu Glu Glu Arg Thr Trp Asp Trp Cys  
 145 150 155 160  
 Trp Met Ala Gln Trp Val Thr Thr Asn Gly Tyr Asp Gln Tyr Asp Asp  
 165 170 175  
 Leu Asn Met His Leu Glu Lys Leu Arg Val Val Gln Ile Ser Arg Lys  
 180 185 190  
 Glu Cys Ala Lys Arg Val Asn Gln Leu Ser Arg Asn Met Ile Cys Ala  
 195 200 205  
 Ser Asn Glu Pro Gly Thr Asn Gly Ile Phe Lys Gly Asp Ser Gly Ala  
 210 215 220  
 Pro Leu Val Cys Ala Ile Tyr Gly Thr Gln Arg Leu Phe Gln Val Gly  
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 Leu Leu Leu Val Ala His Thr Leu Glu Ala Asn Val Glu Cys Gly Val  
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Gln Glu Ala Glu Leu Gly Glu Phe Pro Trp Gln Val Ser Ile Gln Glu	
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Ser Asp His His Phe Cys Gly Gly Ser Ile Leu Ser Glu Trp Trp Ile	
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ctc acc gtg gcc cac tgc ttc tat gct cag gag ctt tcc cca aca gat	295
Leu Thr Val Ala His Cys Phe Tyr Ala Gln Glu Leu Ser Pro Thr Asp	
75 80 85	
ctc aga gtc aga gtg gga acc aat gac tta act act tca ccc gtg gaa	343
Leu Arg Val Arg Val Gly Thr Asn Asp Leu Thr Thr Ser Pro Val Glu	
90 95 100	
cta gag gtc acc acc ata atc cgg cac aaa ggc ttt aaa cgg ctg aac	391
Leu Glu Val Thr Thr Ile Ile Arg His Lys Gly Phe Lys Arg Leu Asn	
105 110 115	
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aat gag ctg acg gtg ccc atc tgc ctt cct ctc tgg ccc gcc cct ccc	487
Asn Glu Leu Thr Val Pro Ile Cys Leu Pro Leu Trp Pro Ala Pro Pro	
135 140 145 150	
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Ser Trp His Glu Cys Trp Val Ala Gly Trp Gly Val Thr Asn Ser Thr	
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gac aag gaa tct atg tca acg gat ctg atg aag gtg ccc atg cgt atc	583
Asp Lys Glu Ser Met Ser Thr Asp Leu Met Lys Val Pro Met Arg Ile	
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ata gag tgg gag gaa tgc tta cag atg ttt ccc agc ctc acc aca aac	631
Ile Glu Trp Glu Glu Cys Leu Gln Met Phe Pro Ser Leu Thr Thr Asn	
185 190 195	
atg ctg tgt gcc tca tat ggt aat gag agc tac gat gct tgc cag ggt	679
Met Leu Cys Ala Ser Tyr Gly Asn Glu Ser Tyr Asp Ala Cys Gln Gly	
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Asp Ser Gly Gly Pro Leu Val Cys Thr Thr Asp Pro Gly Ser Arg Trp	
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Tyr Gln Val Gly Ile Ile Ser Trp Gly Lys Ser Cys Gly Lys Lys Gly	
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Phe Pro Gly Ile Tyr Thr Val Leu Ala Lys Tyr Thr Leu Trp Ile Glu	

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Lys Ile Ala Gln Thr Glu Gly Lys Pro Leu Asp Phe Arg Gly Gln Ser			
265	270	275	
tcc tct aac aag aag aaa aac aga cag aac aat cag ctc tcc aaa tcc			919
Ser Ser Asn Lys Lys Lys Asn Arg Gln Asn Asn Gln Leu Ser Lys Ser			
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Pro Ala Leu Asn Cys Pro Gln Ser Trp Leu Leu Pro Cys Leu Leu Ser			
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Gln Val Ser Ile Gln Glu Ser Asp His His Phe Cys Gly Gly Ser Ile			
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Ala Lys Pro Leu Ala Phe Asn Glu Leu Thr Val Pro Ile Cys Leu Pro			
130 135 140			
Leu Trp Pro Ala Pro Pro Ser Trp His Glu Cys Trp Val Ala Gly Trp			
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Gly Val Thr Asn Ser Thr Asp Lys Glu Ser Met Ser Thr Asp Leu Met			
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Lys Val Pro Met Arg Ile Ile Glu Trp Glu Glu Cys Leu Gln Met Phe			
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Pro Ser Leu Thr Thr Asn Met Leu Cys Ala Ser Tyr Gly Asn Glu Ser			
195 200 205			
Tyr Asp Ala Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Thr Thr			
210 215 220			
Asp Pro Gly Ser Arg Trp Tyr Gln Val Gly Ile Ile Ser Trp Gly Lys			
225 230 235 240			
Ser Cys Gly Lys Lys Gly Phe Pro Gly Ile Tyr Thr Val Leu Ala Lys			
245 250 255			
Tyr Thr Leu Trp Ile Glu Lys Ile Ala Gln Thr Glu Gly Lys Pro Leu			

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Asp	Phe	Arg	Gly	Gln	Ser	Ser	Ser	Asn	Lys	Lys	Lys	Asn	Arg	Gln	Asn				
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Leu	Pro	Cys	Leu	Leu	Ser	Phe	Ala	Leu	Leu	Arg	Ala	Leu	Ser	Asn	Trp				
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gtg	ttg	ctg	ctc	ctg	tcc	ctg	gtc	acg	gga	act	cag	ctc	ggt	cca	cgg		103
Val	Leu	Leu	Leu	Leu	Ser	Leu	Val	Thr	Gly	Thr	Gln	Leu	Gly	Pro	Arg		
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act	cct	ctc	cca	gag	gct	gga	gtg	gct	atc	cta	ggc	agg	gct	agg	gga		151
Thr	Pro	Leu	Pro	Glu	Ala	Gly	Val	Ala	Ile	Leu	Gly	Arg	Ala	Arg	Gly		
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gcc	cac	cgc	cct	cag	ccc	cgt	cat	ccc	ccc	agc	cca	gtc	agt	gaa	tgt		199
Ala	His	Arg	Pro	Gln	Pro	Arg	His	Pro	Pro	Ser	Pro	Val	Ser	Glu	Cys		
			40				45					50					
ggt	gac	aga	tct	att	ttc	gag	gga	aga	act	cgg	tat	tcc	aga	atc	aca		247
Gly	Asp	Arg	Ser	Ile	Phe	Glu	Gly	Arg	Thr	Arg	Tyr	Ser	Arg	Ile	Thr		
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ggg	ggg	atg	gag	gcg	gag	gtg	ggt	gag	ttt	ccg	tgg	cag	gtg	agt	att		295
Gly	Gly	Met	Glu	Ala	Glu	Val	Gly	Glu	Phe	Pro	Trp	Gln	Val	Ser	Ile		
	70				75				80						85		
cag	gca	aga	agt	gaa	cct	ttc	tgt	ggc	ggc	tcc	atc	ctc	aac	aag	tgg		343
Gln	Ala	Arg	Ser	Glu	Pro	Phe	Cys	Gly	Gly	Ser	Ile	Leu	Asn	Lys	Trp		
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tgg	att	ctc	act	gcg	gct	cac	tgc	tta	tat	tcc	gag	gag	ctg	ttt	cca		391
Trp	Ile	Leu	Thr	Ala	Ala	His	Cys	Leu	Tyr	Ser	Glu	Glu	Leu	Phe	Pro		
			105					110					115				
gaa	gaa	ctg	agt	gtc	gtg	ctg	ggg	acc	aac	gac	tta	act	agc	cca	tcc		439
Glu	Glu	Leu	Ser	Val	Val	Leu	Gly	Thr	Asn	Asp	Leu	Thr	Ser	Pro	Ser		
		120					125					130					
atg	gaa	ata	aag	gag	gtc	gcc	agc	atc	att	ctt	cac	aaa	gac	ttt	aag		487
Met	Glu	Ile	Lys	Glu	Val	Ala	Ser	Ile	Ile	Leu	His	Lys	Asp	Phe	Lys		

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Arg Ala Asn Met Asp Asn Asp Ile Ala Leu Leu Leu Leu Ala Ser Pro			
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atc aag ctc gat gac ctg aag gtg ccc atc tgc ctc ccc acg cag ccc			583
Ile Lys Leu Asp Asp Leu Lys Val Pro Ile Cys Leu Pro Thr Gln Pro			
	170	175	180
ggc cct gcc aca tgg cgc gaa tgc tgg gtg gca ggt tgg ggc cag acc			631
Gly Pro Ala Thr Trp Arg Glu Cys Trp Val Ala Gly Trp Gly Gln Thr			
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aat gct gct gac aaa aac tct gtg aaa acg gat ctg atg aaa gcg cca			679
Asn Ala Ala Asp Lys Asn Ser Val Lys Thr Asp Leu Met Lys Ala Pro			
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atg gtc atc atg gac tgg gag gag tgt tca aag atg ttt cca aaa ctt			727
Met Val Ile Met Asp Trp Glu Glu Cys Ser Lys Met Phe Pro Lys Leu			
	215	220	225
acc aaa aat atg ctg tgt gcc gga tac aag aat gag agc tat gat gcc			775
Thr Lys Asn Met Leu Cys Ala Gly Tyr Lys Asn Glu Ser Tyr Asp Ala			
	230	235	240
tgc aag ggt gac agt ggg ggg cct ctg gtc tgc acc cca gag cct ggt			823
Cys Lys Gly Asp Ser Gly Gly Pro Leu Val Cys Thr Pro Glu Pro Gly			
	250	255	260
gag aag tgg tac cag gtg ggc atc atc agc tgg gga aag agc tgt gga			871
Glu Lys Trp Tyr Gln Val Gly Ile Ile Ser Trp Gly Lys Ser Cys Gly			
	265	270	275
gat aag aac acc cca ggg ata tac acc tgc ttg gtg aac tac aac ctc			919
Asp Lys Asn Thr Pro Gly Ile Tyr Thr Ser Leu Val Asn Tyr Asn Leu			
	280	285	290
tgg atc gag aaa gtg acc cag cta gga ggc agg ccc ttc aat gca gag			967
Trp Ile Glu Lys Val Thr Gln Leu Gly Gly Arg Pro Phe Asn Ala Glu			
	295	300	305
aaa agg agg act tct gtc aaa cag aaa cct atg ggc tcc cca gtc tcg			1015
Lys Arg Arg Thr Ser Val Lys Gln Lys Pro Met Gly Ser Pro Val Ser			
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Gly Val Pro Glu Pro Gly Ser Pro Arg Ser Trp Leu Leu Leu Cys Pro			
	330	335	340
ctg tcc cat gtg ttg ttc aga gct att ttg tac tgataataaaa atagaggcta			1116
Leu Ser His Val Leu Phe Arg Ala Ile Leu Tyr			
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35      40      45
Pro Val Ser Glu Cys Gly Asp Arg Ser Ile Phe Glu Gly Arg Thr Arg
50      55      60
Tyr Ser Arg Ile Thr Gly Gly Met Glu Ala Glu Val Gly Glu Phe Pro
65      70      75
Trp Gln Val Ser Ile Gln Ala Arg Ser Glu Pro Phe Cys Gly Gly Ser
85      90      95
Ile Leu Asn Lys Trp Trp Ile Leu Thr Ala Ala His Cys Leu Tyr Ser
100     105     110
Glu Glu Leu Phe Pro Glu Glu Leu Ser Val Val Leu Gly Thr Asn Asp
115     120     125
Leu Thr Ser Pro Ser Met Glu Ile Lys Glu Val Ala Ser Ile Ile Leu
130     135     140
His Lys Asp Phe Lys Arg Ala Asn Met Asp Asn Asp Ile Ala Leu Leu
145     150     155
Leu Leu Ala Ser Pro Ile Lys Leu Asp Asp Leu Lys Val Pro Ile Cys
165     170     175
Leu Pro Thr Gln Pro Gly Pro Ala Thr Trp Arg Glu Cys Trp Val Ala
180     185     190
Gly Trp Gly Gln Thr Asn Ala Ala Asp Lys Asn Ser Val Lys Thr Asp
195     200     205
Leu Met Lys Ala Pro Met Val Ile Met Asp Trp Glu Glu Cys Ser Lys
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Met Phe Pro Lys Leu Thr Lys Asn Met Leu Cys Ala Gly Tyr Lys Asn
225     230     235
Glu Ser Tyr Asp Ala Cys Lys Gly Asp Ser Gly Gly Pro Leu Val Cys
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Thr Pro Glu Pro Gly Glu Lys Trp Tyr Gln Val Gly Ile Ile Ser Trp
260     265     270
Gly Lys Ser Cys Gly Asp Lys Asn Thr Pro Gly Ile Tyr Thr Ser Leu
275     280     285
Val Asn Tyr Asn Leu Trp Ile Glu Lys Val Thr Gln Leu Gly Gly Arg
290     295     300
Pro Phe Asn Ala Glu Lys Arg Arg Thr Ser Val Lys Gln Lys Pro Met
305     310     315
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 <223> "PRO1-E", an artificially synthesized primer  
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 Pro Ser Pro Val Leu Met Glu Ala Arg Val Asp Leu Ile Asp Leu Asp  
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 Leu Cys Asn Ser Thr Gln Trp Tyr Asn Gly Arg Val Thr Ser Thr Asn  
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 Val Cys Ala Gly Tyr Pro Glu Gly Lys Ile Asp Thr Cys Gln Gly Asp  
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 Ser Gly Gly Pro Leu Met Cys Arg Asp Asn Val Asp Ser Pro Phe Val  
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 Pro Gly Val Tyr Thr Ala Thr Trp Asp Tyr Leu Asp Trp Ile Ala Ser  
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 Lys Ile Gly Pro Asn Ala Leu His Leu Ile Gln Pro Ala Thr Pro His  
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 Ser Phe Thr Ile Ala Thr Gln His Met Arg His Arg Thr Thr Leu Ser  
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 Tyr Pro Met Lys His Pro Ser Gln Tyr Ser Gly Pro Arg Asn Tyr His  
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 Ser Ser Val Pro Tyr Gln Val Ser Leu Asn Ala Gly Tyr His Phe Cys  
 35 40 45  
 Gly Gly Ser Leu Ile Asn Asp Gln Trp Val Val Ser Ala Ala His Cys  
 50 55 60  
 Tyr Lys Tyr Arg Ile Gln Val Arg Leu Gly Glu His Asn Ile Asn Val  
 65 70 75 80  
 Leu Glu Gly Asn Glu Gln Phe Val Asp Ser Ala Lys Ile Ile Arg His  
 85 90 95  
 Pro Asn Tyr Asn Ser Trp Thr Leu Asp Asn Asp Ile Met Leu Ile Lys  
 100 105 110  
 Leu Ala Ser Pro Val Thr Leu Asn Ala Arg Val Ala Ser Val Pro Leu  
 115 120 125  
 Pro Ser Ser Cys Ala Pro Ala Gly Thr Gln Cys Leu Ile Ser Gly Trp



130						135						140					
Gly	Asn	Thr	Leu	Ser	Asn	Gly	Val	Asn	Asn	Pro	Asp	Leu	Leu	Gln	Cys		
145					150					155					160		
Val	Asp	Ala	Pro	Val	Leu	Pro	Gln	Ala	Asp	Cys	Glu	Ala	Ser	Tyr	Pro		
				165					170					175			
Gly	Asp	Ile	Thr	Asn	Asn	Met	Ile	Cys	Val	Gly	Phe	Leu	Glu	Gly	Gly		
			180					185					190				
Lys	Asp	Ser	Cys	Gln	Gly	Asp	Ser	Gly	Gly	Pro	Val	Val	Cys	Asn	Gly		
	195						200					205					
Glu	Leu	Gln	Gly	Ile	Val	Ser	Trp	Gly	Tyr	Gly	Cys	Ala	Gln	Pro	Asp		
	210					215					220						
Ala	Pro	Gly	Val	Tyr	Thr	Lys	Val	Cys	Asn	Tyr	Val	Asp	Trp	Ile	Gln		
225					230					235					240		
Asn	Thr	Ile	Ala	Asp	Asn												
				245													